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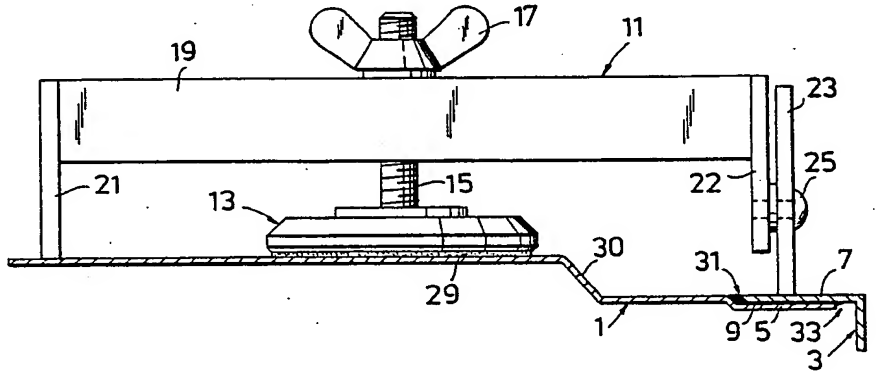


(57) Abstract

Device for securing an overlap adhesive joint between two workpieces, in the form of vehicle body panel parts, particularly a joggled joint comprising a bridge element (11) adapted at its first end (21) to enable supporting engagement against the surface of the first workpiece (1) at a distance from the joint (5, 7, 9) and adapted at its second end (22, 23) to enable the achievement of joint-securing pressure against the surface of the second overlapping workpiece (3) in the region of the joint; an attachment plate (13) adapted such as to enable its being held by an adhesive joint (29) on said surface of the first workpiece in the region between the joint and the location of engagement of said first end against the surface of the first workpiece; and means (15, 17) for lockably connecting and tightening the bridge element (11) and attachment plate (13) such as to press the bridge element, applied for securing the joint, against the workpieces with said first end (21) engaging against the first workpiece (1) and said second end (22, 23) achieving securing pressure on the joint (5, 7, 9) determined by the amount of tightening.

TITLE OF INVENTION

Device for securing an overlap adhesive joint.

TECHNICAL FIELD

The present invention relates to a device for securing an overlap adhesive joint between two workpieces, particularly a joggled joint. The device in accordance with the invention is intended for use in conjunction with joining vehicle body panel parts, particularly in conjunction with the fastening of so-called economy panel parts.

TECHNICAL BACKGROUND

There is a great amount of rust and damage repairs to vehicle bodies. The kind of activity envisaged here is, for example, the repair of panel edges that have rusted away or the repair of collision and similar damage, in which so-called economy panel parts are utilized.

Up to now, these economy panel parts have usually been put in place with the aid of welding. Welding requires special equipment, extensive dismantling of combustible material and causes difficulties with respect to protection against later rust attack.

Economy panel parts have also been put in place while utlizing riveted and/or screwed joints, these methods being complex and from many aspects giving poorer joint properties, however.

More recently it has been proposed that body panel parts could be joined together using an adhesive joint. In order that an adhesive joint shall be sufficiently good there is required a uniform and well-adjusted compression of the joint while the adhesive sets. In certain cases, such compression can be provided by different kinds of cramps, namely when the joint is accessible from both sides. However, the latter is often not the case, particularly when joggled joints are involved, where only one side is accessible, this side generally being the outside of the body panel. In these

SUMMARY OF THE INVENTION

The above-mentioned object is achieved with a device which, in accordance with the invention, has the distinguishing features disclosed in the accompanying claims.

The inventive device is thus essentially distinguished in that it includes a bridge element, one end of which is adapted such as to enable supporting engagement at a distance from the joint against the surface of the first workpiece, its other end being adapted for enabling the achievement of joint securing pressure in the region of the joint against the surface facing towards the device of the second overlapping workpiece; an attachment plate arranged for enabling removable attachment, with the aid of an adhesive joint, to said surface of the first workpiece in the region between the joint and the position of engagement of said first end against the surface of the first workpiece; and means for lockably connecting and tighten the bridge element and the attachment plate to urge the bridge element applied for securing purpose against the workpieces with said first end engaging against the first workpiece and said second end achieving securing pressure on the joint determined by the amount of tightening. The term "bridge element" is intended to have a wide sense in the present context, and is intended to cover any element enabling two spaced points of support or contact facing generally in the same direction and having therebetween an intermediate attachment plate and associated connection means.

In utilising a device in accordance with the invention, it may be mounted substantially over the first workpiece, because only an end portion of it needs to be situated above, and act on, the joint part of the second workpiece. As will be understood, this signifies that the second workpiece does not need to have any great free extension at the joint itself, and may, for instance, merely have a small free edge region (which thus constitutes the joint region) against which the device may be applied.

piece, even if this is a thin vehicle body panel, and such that the tensional stress in a direction away from the workpiece caused by the tightening of the device, can be taken up to a required extent. However, the bond of the attachment plate can be suited so that the plate will be released if an attempt is made to tighten the device too much, which could give deformation in the joint.

For attaching the attachment plate, suitably an adhesive agent is used which has a substantially lower resistance to peeling or shearing than to pure tensional force away from the attachment surface on the workpiece. Thus, after use the attachment plate can be easily removed by peeling off or shearing, without the workpiece being damaged.

Adhesion of the attachment plate can be effected to advantage with the use of double-sized adhesive tape, which can easily be applied to the bottom of the attachment plate each time it is used.

It is to be emphasized that the utilisation of an attachment plate adhered in accordance with the invention signifies that the workpieces only need to be prepared minimally before applying the device. All that is required is that the surface of the first workpiece is cleaned (even this might not be necessary) sufficiently for the adhesive to take.

The securing pressure on the joint can be achieved by the end of the bridge element engaging directly against the joint, or via a separate intermediate press element. In the latter case there will be further adjustment and force distribution possibilities, since the position of the press element under the urging bridge element will be freely selectable. The press element is suitably made elongate and placed along the joint transverse the bridge element, whereby the pressure from the bridge element can be distributed along the joint in accordance with the number of joint engagement locations exhibited by the press element.

The invention will now be described in more detal with the aid of an exemplifying embodiment and with reference to the accompanying drawing.

2-component polyurethane adhesive which sets already at about 20°C. The thickness of the panel sheet is typically about 1 mm.

One or more devices in accordance with the invention are utilized for compressing the joint while the adhesive sets. Such a device includes a bridge element 11, an attachment plate 13 and connection means 15, 17. The bridge element 11 is a straight beam element and comprises two spaced, mutually parallel flats 19,20 on edge, with downwardly, dependent end elements 21,22, also of flats, at either end. The end elements 21,22 are welded to the flats 19,20, thus forming a rigid connection thereof. The end elements 21,22 are at right angles to the plane of the flats 19,20. The end elements 21,-22 are of the same length and are downwardly cut square to give the best engagement surface. There is an extension element 23 downwardly on the end element 22, this also being in the form of a straight flat fastened parallel to the element 22 and rotatably with the aid of a journalling pin 25. The element 23 is mounted with unequal distances to its ends so that two different extension lengths can be obtained. The mounting is also situated sufficiently high up on the end element 22 so that the element 23 is entirely above the lower engagement surface of the end element 22 after being rotated 90° (see Fig. 3).

The attachment plate 13 is a flat disc, and on its underside it is provided with double-sized adhesive tape 29 for attaching the plate to the panel part 1 or 2. There is a threaded rod 15 projecting at right angles to the attachment plate, the length of the rod being such that it passes between and projects beyond the opposite sides of the flats 19,20. The diameter of the rod 15 is somewhat less than the spacing of the flats 19,20. A wing nut 17 is threaded on to the rod 15 and together they form means for connecting the attachment plate 13 and bridge element 11.

When the device according to Figs. 1 and 2 is applied, the attachment plate 13 is attached at a suitable distance

nels), because then the centre of gravity of the device will lie close to the panel parts which means that the bending moment on the attachment plate caused by the force of gravity will be low.

A variation of the device in accordance with the invention is illustrated in Figs. 3 and 4, a separate press element 35 being utilized for transferring the compressive force from the bridge element 11 to the joint. This separate element 35 is a straight, square hollow tube, which is placed under the compressive end of the beam elements 19,20 at right angles to the longitudinal direction of the bridge element 11. The element 35 is provided at either end with two abutment surfaces 37,38 on its underside. It will be understood that the element 35 may easily be given a desired location relative the bridge element 11, thereby achieving a desired distribution and spread of the securing pressure. As will be seen in Fig. 3, the elements 22 and 23 have no function in this case, and they could thus be eliminated.

Finally in Fig. 5, there is schematically illustrated how a plurality of devices in accordance with the invention can be used for securing a long adhesive joint of the kind already illustrated. Furthest to the right where the joint begins, there is utilized a device in the way illustrated in Fig. 1. The devices successive to it are utlized in the way illustrated in Fig. 3. It will be understood that even if all the devices in Fig. 5 are illustrated as being applied at right angles to the longitudinal direction of the joint they could have some other angle if so desired, e.g. due to projecting obstacles, lack of space for attaching the plate 13 etc.

It will be understood that a device in accordance with the invention is extremely simple to handle, apply and adjust; that it has an uncomplicated structure which is cheap and which can be readily dimensioned for different loads; that it can be used without the workpieces involved being subjected to any deformations or other damage; that it is

CLAIMS

1. Device for securing an overlap adhesive joint between two workpieces, in the form of vehicle body panel parts, particularly a joggled joint, ***characterized*** in that it includes a bridge element with its first end adapted for enabling supporting engagement against the surface of the first workpiece at a distance from the joint, and its second end adapted for achieving joint securing pressure against the surface of the second overlapping workpiece in the region of the joint; an attachment plate adapated to enable its attachment with the aid of a detachable adhesive joint on the surface of the first workpiece in the region between the joint and the location of engagement of said first end against the surface of the first workpiece; and means for lockably connecting and tightening the bridge element and attachment plate for pressing the bridge element, which has been applied for securing the joint, against the workpieces with said first end engaging against said first workpiece and said second end achieving securing pressure on the joint, this pressure being determined by the degree of tightening.

2. Device as claimed in claim 1, ***characterized*** in that the attachment plate is adapated for being attached to the first workpiece with the aid of double-sized adhesive tape.

3. Device as claimed in claim 1 or 2, ***characterized*** in that the adhesive utilized in the adhesive joint holding the attachment plate has the property that the adhesive joint obtained on application has substantially higher resistance to tensional stress substantially normal to the first workpiece than to peeling or sheering action, so that the plate can be readily removed after the securing process is terminated.

4. Device as claimed in any one of claims 1, 2 or 3, characterized in that the adhesive utilized in the adhesive joint for the attachment plate is selected such that the adhesive joint obtained on application relinquishes its hold at

Fig. 1

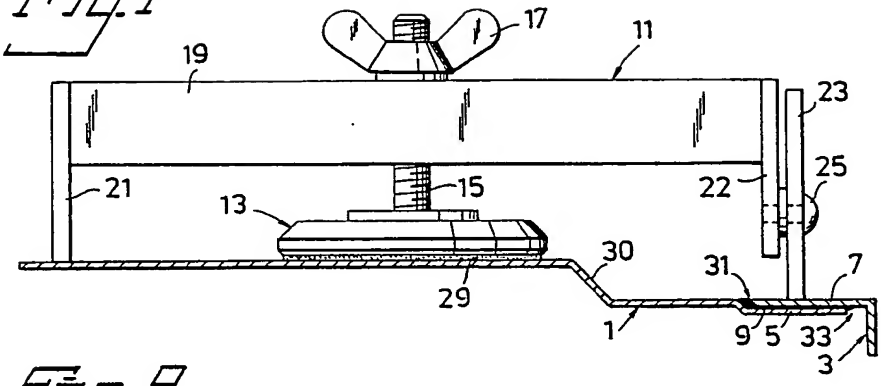


Fig. 2

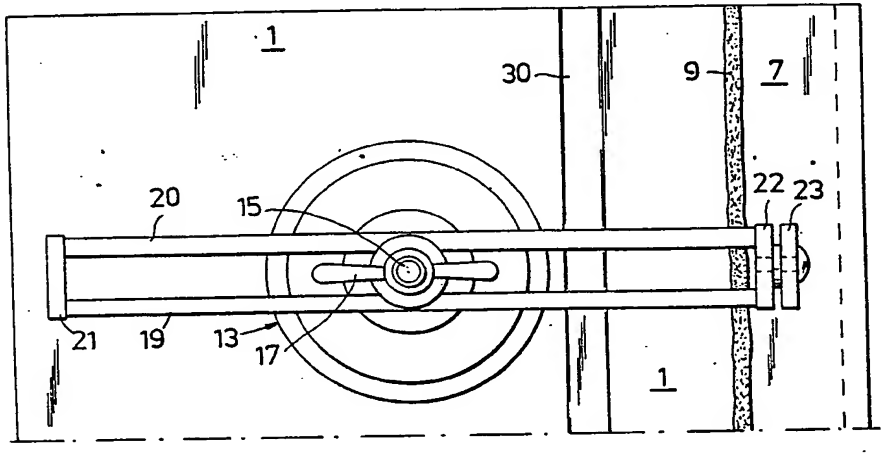
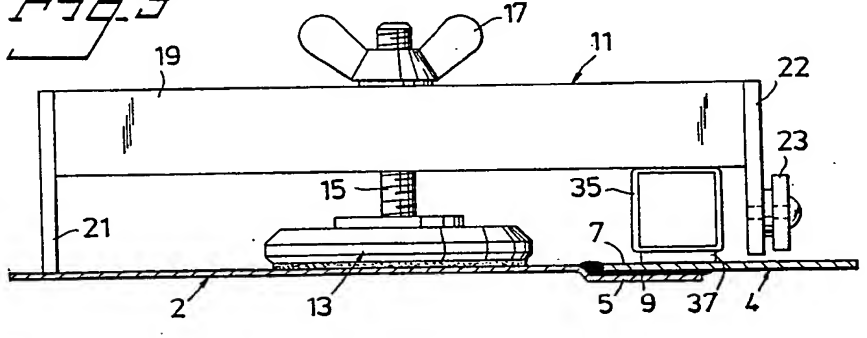


Fig. 3



SUBSTITUTE SHEET

INTERNATIONAL SEARCH REPORT

International Application No PCT/SE86/00393

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) [6]

According to International Patent Classification (IPC) or to both National Classification and IPC 4

B 25 B 11/00

II. FIELDS SEARCHED

Minimum Documentation Searched [7]

Classification System	Classification Symbols
IPC 4	B 25 B 5/00, /14, /16, 11/00; B 23 Q 3/06, /08; B 25 H 1/08; C 09 J 5/00, /10; F 16 B 47/00

.../...

Documentation Searched other than Minimum Documentation to the Extent that such Documents are included in the Fields Searched [8]

SE, NO, DK, FI classes as above

III. DOCUMENTS CONSIDERED TO BE RELEVANT [9]

Category [10]	Citation of Document, [11] with indication, where appropriate, of the relevant passages [12]	Relevant to Claim No. [13]
X	US, A, 2 379 136 (G C ERWIN) 26 June 1945	1-9
A	US, A, 2 713 379 (H B SISSON) 19 July 1955	
A	DE, A, 1 752 232 (R L ROBINSON) 19 May 1971	8-9
A	FR, A, 2 414 140 (IAO INDUSTRIE RIUNITE SPA) 3 August 1979	
A	GB, A, 1 146 892 (B J FRYE) 16 March 1966	
P	SE, A, 8502952-8 (O A SÖLLMAN) 24 July 1986	

* Special categories of cited documents: [10]

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"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

IV. CERTIFICATION

Date of the Actual Completion of the International Search	Date of Mailing of this International Search Report
1986-11-20	1986 -11- 24
International Searching Authority	**Signature of Authorized Officer**
Swedish Patent Office	Ronny Jansson

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